WHAT IS CLAIMED IS:

1. A process of producing a polymer comprising subjecting a monomer to aqueous solution polymerization while controlling the temperature using at least one device of an external circulation device and an internal coil device each having heat exchanging function.

2. The process of producing a polymer according to claim 1, wherein the monomer is a (meth)acrylic acid based monomer.

3. The process of producing a polymer according to claim 1 or 2, wherein the polymerization temperature is 50 °C or higher but lower than the boiling point.

4. The process of producing a polymer according to claim 1 or 2, wherein the polymerization reaction solution contains one or more heavy metal ions.

5 The process of producing a polymer according to claim 3, wherein the polymerization reaction solution contains one or more heavy metal ions.

6. The process of producing a polymer according to claim 4, wherein the heavy metal ions are one or more iron ions.

7. The process of producing a polymer according to claim 5, wherein the heavy metal ions are one or more iron ions.

8. The process of producing a polymer according to claim 1 or 2, wherein the polymerization reaction is carried out while adding the monomer for an addition period of time in the range of from 1 to 8 hours.

9. The process of producing a polymer according to claim 3, wherein the polymerization reaction is carried out while adding the monomer for an addition period of time in the range of from 1 to 8 hours.

10. The process of producing a polymer according to claim 1 or 2, wherein the polymerization reaction solution has a viscosity of not more than 1,000 mPa·s.

11. The process of producing a polymer according to claim 3, wherein the polymerization reaction solution has a viscosity of not more than 1,000 mPa·s.

12. The process of producing a polymer according to claim 1 or 2, wherein a solution flow rate of the external circulation device is from 0.01 to 15 % by volume of the total charge amount of the polymer solution per minute.

13. The process of producing a polymer according to claim 3, wherein a solution flow rate of the external circulation device is from 0.01 to 15 % by volume of the total charge amount of the polymer solution per minute.

14. The process of producing a polymer according to claim 1 or 2, wherein a solution holding amount of the external circulation device is from 1 to 30 % by volume of the total charge amount of the polymer solution.

15. The process of producing a polymer according to claim 3, wherein a solution holding amount of the external circulation device is from 1 to 30 % by volume of the total charge amount of the polymer solution.

16. A process for producing a (meth)acrylylic acid based polymer by polymerizing a (meth)acrylylic acid based monomer in a polymerization reaction solution, wherein the polymerization reaction solution contains one or more of a persulfate and one or more of a bisulfite as the initiator, and the polymerization reaction solution contains one or more heavy metal ions.

17. The process for producing a (meth)acrylylic acid based polymer according to claim 16, wherein the heavy metal ions are one or more iron ions.